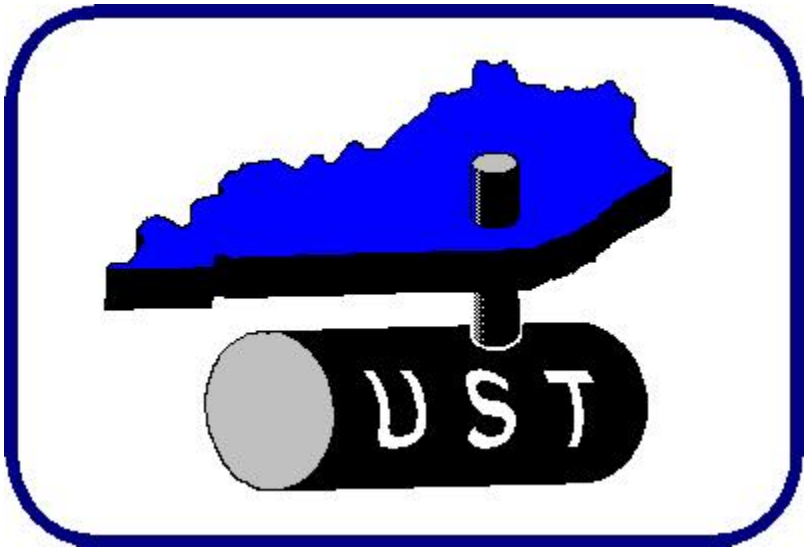
401 KAR 42:040

SITE ASSESSMENT OUTLINE FOR EXTERNAL UST SYSTEM RELEASE DETECTION METHODS (GROUNDWATER, VAPOR AND INTERSTITIAL MONITORING)



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INTRODUCTION

Pursuant to Kentucky Administrative Regulations 401 KAR 42:040, owners and operators shall perform a site assessment prior to the installation of external UST system release detection monitoring wells or detection devices.

A site assessment for UST system release detection requirements is a collection of site-specific data and information that will determine the suitability of an external UST system release detection method (i.e. groundwater, vapor, or interstitial monitoring) for a particular UST system. The site assessment shall contain technical documentation detailing how the number, depth and placement of monitoring wells or detection devices were derived to provide accurate UST system release detection monitoring for the tanks and or the associated piping within the UST excavation zone (backfill). As with all monthly monitoring methods, groundwater, vapor and interstitial monitoring shall be sampled or measured and recorded at least once every 30-calendar days. These records shall be maintained by the owner or operator for inspection by the cabinet. Monthly monitoring records shall be kept for one (1) year.

Pursuant to KRS 322 and KRS 322(a), any work constituting the public practice of engineering or geology, including a site assessment for external UST system release detection report and relevant checklists, shall be completed and signed by a Professional Engineer (P.E.) Registered with the Kentucky Board of Registration for Professional Engineers and Land Surveyors, or a Professional Geologist (P.G.) registered with the Kentucky Board of Registration for Professional Geologists.

This outline is provided to assist owners and operators in complying with the site assessment requirements and preparing the site assessment report that will support the use of a specific external UST system release detection method. This outline provides the minimum requirements for site assessments for groundwater, vapor, or interstitial UST system release detection monitoring. Some UST facilities have unique features and may require additional information. A copy of the site assessment report shall be submitted to the cabinet within 30-calendar days from the installation of the external UST system release detection monitoring method.

If a UST system release is suspected or detected using any monthly monitoring method, it shall be reported immediately at 800-928-2380 in accordance with 401 KAR 42:050, and any initial abatement steps shall be undertaken as described in the UST System Release Response and Initial Abatement Requirements Outline (January 2006) in accordance with 401 KAR 42:060. Upon written direction from the cabinet, UST system release confirmation steps shall be undertaken as required by 401 KAR 42:050, 42:060, and the Site Check Outline (January 2006). Both outlines referenced in this paragraph are incorporated by reference in 401 KAR 42:060.

1.0 SITE ASSESSMENT REPORT

1.1 Provide the site name, location and Agency Interest Number.

1.2 Provide the applicable section of a topographic map depicting the location of the site. The map shall also indicate the surrounding properties and the nearest town, city, or community. Provide the USGS topographic quadrangle name in which the site is located.

1.3 Provide a detailed site map. The site map shall illustrate tank and piping locations, all external UST system release detection monitoring locations (wells or detection devices) and the distances between them, depths of all tank pits, property boundaries, topography, adjacent properties, and any other pertinent features of the site. The map shall also include underground utility trenches (to scale, indicating the type of service and depth of trench). The map shall be to scale and include a north arrow and legend.

1.4 Provide the longitude and latitude for all tank systems located at the site.

1.5 Provide original site photographs with descriptive captions, showing installation of the external UST system release detection equipment.

1.6 Provide information as specified in the Site Assessment Report Checklist, for the external UST system release detection technology to be used at the site.

1.7 Complete and provide all applicable signatures as required by the Certification of the Site Assessment Report located in Appendix A.

2.0 GROUNDWATER MONITORING - EXTERNAL UST SYSTEM RELEASE DETECTION

Groundwater monitoring is a monthly method of external UST system release detection for tanks and piping that utilizes monitoring wells, or detection devices, to detect UST system releases from the UST system into the groundwater. The site shall be assessed within and immediately below the excavation zone prior to well installation. The site assessment information shall establish the number, depth, and placement of the wells, or detection devices necessary to provide accurate UST system release detection for the UST system.

2.1 To use this monitoring method, groundwater can never be deeper than 20 feet (6 meters) below the ground surface. During monitoring well installation for this method, seasonal fluctuations in the groundwater table shall be taken into consideration. The depth and flow direction shall be established to ensure the wells will be installed to intercept and detect a UST system release into the groundwater. Groundwater depth and flow direction (hydrologic patterns) shall be documented by drilling subsurface borings or other accurate methods. With all methods, the prevailing hydrologic patterns shall be documented. (The direction of groundwater flow is typically determined by obtaining static water levels from three (3) locations (boreholes) in a triangular configuration.) Any boreholes installed for the sole purpose of determining hydrologic patterns shall be properly abandoned as described in the Site Investigation Outline (January 2006). The outline is incorporated by reference in 401 KAR 42:060. Seasonal and short-term variations of hydrologic patterns shall be depicted on site-specific maps and cross sections (to scale). Include a north arrow and legend on all maps.

2.2 The hydraulic conductivity of the soil(s) between the monitoring wells and the UST system shall not be less than 0.01 cm/sec (e.g. pea gravel or coarse sand).

2.3 Monitoring wells shall be installed by a certified driller. Contact the Division of Water for information on well driller certification (502-564-3410). Copies of the well construction records, for monitoring wells or detection devices, installed within the backfill, shall be submitted to the cabinet at, 81 C. Michael Davenport Blvd., Frankfort, Kentucky 40601. A copy of the External UST System Release Detection Well Form, (DEP8051/01/06) which is incorporated by reference in 401 KAR 42:040, shall be submitted for each well, as an appendix to the Site Assessment for External UST System Release Detection Report.

2.4 Monitoring wells or detection devices shall be installed to a depth two (2) feet (0.61 meter) deeper than the bottom(s) of the tank(s), and have a minimum casing diameter of two (2") inches.

2.5 The slotted portion of the monitoring well casing shall be designed to prevent migration of natural soils or filter pack into the well and to allow entry of regulated substance on the water table into the well under all annual groundwater fluctuations.

2.6 Monitoring wells shall be properly decommissioned as described in the Site Investigation Outline (January 2006) incorporated by reference in 401 KAR 42:060 once the monitoring well is determined to be unsuitable for use as an external release detection method.

2.7 Monitoring wells shall be clearly marked and secured to avoid unauthorized access and tampering. The well pad shall be raised above surface grade and sloped to prevent infiltration of surface water into the monitoring well.

2.8 The regulated substance(s) stored in the UST system shall be immiscible in water and have a specific gravity of less than one (1), and the continuous monitoring devices (probes/sensors) or manual methods (bailers, etc.) used shall be capable of detecting one-eighth (1/8") of an inch of free product on top of the groundwater in the monitoring wells.

2.9 If groundwater monitoring is used for the tank pit only and not the piping trench(es), then either another monitoring method shall be used for the pressurized piping or it shall be tightness tested annually along with an annual operational test of the automatic line leak detector. If monitoring wells or detection devices are used to detect UST system releases along the piping trench, then they shall be installed within the piping trench at a distance of no more than 20 feet (6 meters) apart, to provide accurate monitoring. Monitoring wells or detection devices installed to monitor the tank(s) shall intercept the excavation zone (backfill) or be as close to it as technically feasible. Minimum horizontal distances from the tank(s) or piping shall be established and documented in the Site Assessment Report. In order to inhibit corrosion effects, monitoring wells or detection devices shall not be installed in contact with the tank(s) or piping.

3.0 VAPOR MONITORING - EXTERNAL UST SYSTEM RELEASE DETECTION

Vapor monitoring is a monthly method of external UST system release detection for tanks and piping that utilizes monitoring wells or detection devices to detect UST system releases, by way of petroleum product vapors or tracer compound, from the UST system into the soil(s). Vapor samples are measured and compared to any existing baseline contamination measurements for the particular site.

3.1 For vapor monitoring purposes, baseline contamination is the measurable presence of petroleum vapors, at the site, resulting from spill, overfill, or previous UST system release (i.e. background contamination). Each site shall establish its specific baseline vapor level measurement, and designate which vapor monitoring well is the "baseline well". Ideally, if no prior UST system release or spill has occurred, the baseline should be at, or near, a measurement of zero.

3.2 Baseline vapor levels of contamination in the excavation zone shall not interfere with UST system release vapors so that a UST system release can go undetected.

3.3 Vapor monitoring wells or detection devices, shall be constructed to prevent sloughing of backfill material into the borehole, while allowing diffuse vapors to enter. The wells, or detection

devices, shall be installed in backfill that is sufficiently porous (e.g. pea gravel, coarse sand) to allow diffusion of vapors from UST system releases through the excavation area (backfill). A copy of the External UST System Release Detection Well Form (DEP8051/01/06), shall be submitted for each well, as an appendix to the Site Assessment for External UST System Release Detection Report.

3.4 The stored regulated substance shall be sufficiently volatile (e.g. gasoline) to result in a vapor level that is detectable by the monitoring wells or detection devices in the excavation zone. For example, waste oil tanks are not suitable for vapor monitoring because waste oil is not sufficiently volatile. If vapor monitoring is intended for diesel oil tanks then it shall be documented that a constituent of the diesel oil, or a tracer compound placed in the tank system, is sufficiently volatile to be accurately detected if a UST system release occurs.

3.5 The measurement of vapors by the monitoring wells or detection devices shall not be interfered with by groundwater, rainfall, or soil moisture so that a UST system release can go undetected for more than 30-calendar days.

3.6 The vapor monitors or detection devices, shall be calibrated specifically for the type of regulated substance(s) stored in the UST system. The monitor shall be capable of detecting a UST system release reading above the established baseline measurement or the existence of a tracer compound.

3.7 Monitoring wells shall be installed two (2) feet deeper than the bottom(s) of the tank(s), and shall be clearly marked and secured from tampering or unauthorized access. The well pad shall be raised above surface grade and sloped to prevent infiltration of surface water into the monitoring well. At the time of site closure, monitoring wells shall be properly abandoned. They shall be sealed from bottom to top as described in the Site Investigation Outline (January 2006), incorporated by reference in 401 KAR 42:060.

3.8 The site assessment of the UST excavation zone, performed prior to well installation, will establish the number, depth and placement of vapor monitoring wells required at a site to accurately detect a UST system release.

3.9 If vapor monitoring is used for the tank pit only, and not the piping trench(es), then either another monthly monitoring method shall be used for the pressurized piping or it shall be tightness tested annually along with an annual operational test of the automatic line leak detector. Monitoring wells shall be installed along and within the piping trench and shall be no more than 20 feet (6 meters) apart to provide accurate monitoring. Monitoring wells or detection devices installed to monitor the tank(s) shall intercept the excavation zone (backfill) or as close to it as technically feasible. Minimum horizontal distances from the tank(s) or piping shall be established and documented in the Site Assessment Report. In order to inhibit corrosion effects, monitoring wells or detection devices shall not be installed in contact with the tank(s) or piping.

4.0 INTERSTITIAL MONITORING - EXTERNAL UST SYSTEM RELEASE DETECTION

A UST system utilizing a "secondary barrier" within the excavation zone to provide UST system release detection for the tanks and piping, is a type of interstitial monitoring for external UST system release detection. Double-walled tanks also use interstitial monitoring, but it is not an external method. Instead, it is an internal tank method, which monitors the space (interstice) between the inner and outer tank wall for a UST system release.

4.1 The secondary barrier (liner) shall be an artificial material that is placed around and beneath the UST system. The liner shall be sufficiently thick and impermeable (at least 10^{-6} cm/sec.) to direct a UST system release to a monitoring point (well or detection device) where it can be detected.

4.2 The backfill within the excavation zone shall be sufficiently porous (e.g. pea gravel, coarse sand) for the liner to direct the UST system release to a monitoring point.

4.3 The liner shall be compatible with the regulated substance stored in the UST system so that it will not deteriorate the liner and allow a UST system release to pass through the secondary barrier into the environment.

4.4 For cathodically protected UST systems, the liner shall be installed so that it does not interfere with the cathodic protection system.

4.5 The site assessment report provides information that documents the liner will always be above the 25-year flood plain, unless the liner and monitoring designs are for use under such conditions.

4.6 Groundwater, soil moisture, or rainfall shall not interfere with the monthly monitoring testing or sampling so that a UST system release can go undetected for more than 30-calendar days.

4.7 Monitoring points (wells or detection devices) within the secondary barrier shall be clearly marked and secured to avoid unauthorized access and tampering. The well pad shall be raised above surface grade and sloped to prevent infiltration of surface water into the monitoring well. A copy of the External UST System Release Detection Well Form (DEP8051/01/06), shall be submitted for each well as an appendix to the Site Assessment for External UST System Release Detection Report.

4.8 The number, depth and placement of monitoring points (wells or detection devices) within the secondary barrier (liner) shall be determined by the Site Assessment and site-specific information.

SITE ASSESSMENT REPORT CHECKLIST

Site Name_____ County_____

Location_____ AI No._____

Check each item included in the Site Assessment Report(s). Omitted items shall be addressed in the report's cover letter. The complete checklist shall be submitted with each copy of the final report in order to expedite review of the Site Assessment Report.

Check Response

1.0 Agency Interest Number and Location

____ 1.1 List the site name, location, and the Agency Interest number.

____ 1.2 Include the relevant portion of a topographic map indicating the exact location of the site. The map shall be to scale with north arrow, legend, quadrangle name, etc.

____ 1.3 Provide a detailed, site-specific map that indicates all UST system release detection monitoring wells or detection devices, and the distances between them for the site which is to scale and includes a north arrow, legend, etc.

____ 1.4 List the longitude and latitude of the tank pit area(s).

____ 1.5 Submit site photographs with descriptions showing installation of the external UST system release detection system.

____ 1.6 Provide information as specified in the Site Assessment Report Checklist, for the external UST system release detection technology to be used at the site.

____ 1.7 Complete and provide all applicable signatures as required by the Certification of the Site Assessment Report located in Appendix A.

2.0 Groundwater Monitoring - External UST System Release Detection

____ 2.1 Provide documentation establishing groundwater depth, seasonal fluctuations and flow direction(s) used for deriving the number, depth and placement of the monitoring wells or detection devices.

____ 2.2 Submit information characterizing the hydraulic conductivity of the soils(s) between the monitoring wells and UST system.

____ 2.3 Submit documentation showing that the monitoring wells were installed by a certified driller to intercept the excavation zone and groundwater flow. Submit a copy of the External UST system release Detection Well Form (DEP8051/01/06) for each well installed at the site.

____ 2.4 Provide information establishing that the monitoring wells or detection devices were installed two (2) feet (.61 meters) deeper than the bottom(s) of tank(s) and have a minimum casing diameter of two (2") inches.

____ 2.5 Submit records for the monitoring well(s) showing that the slotted portion (give size) of the well casing will prevent migration of soils etc., into the well while allowing entry of regulated substance on the water table into the monitoring well. Also, submit records demonstrating that the monitoring wells are sealed from the ground surface to the top of the filter pack.

____ 2.6 Provide information showing that the monitoring wells are clearly marked and secured, with the well pad sloped and raised above surface grade.

____ 2.7 Submit information that the groundwater monitoring device(s) can detect one-eighth (⅛) of an inch of free product on top of the groundwater.

____ 2.8 Provide documentation establishing what type of monthly monitoring is being conducted for pressurized piping. Monitoring wells or detection devices shall be installed at a distance no more than 20 feet (6 meters) apart along any piping trench.

3.0 Vapor Monitoring - External UST System Release Detection

____ 3.1 Provide the "baseline" vapor level measurement for the site and document how it was established for the UST system. Also identify, on a monitoring well location map, the baseline monitoring well or detection device.

____ 3.2 Provide information on the type of vapor monitoring device(s) used, and summarize its suitability for the specific UST system. Include any baseline level interference considerations.

____ 3.3 Submit information establishing the suitability of the backfill material to allow diffusion of vapors to the vapor monitoring wells or detection devices.

____ 3.4 Provide information that establishes the suitability of the stored regulated substance or tracer compound to be vapor monitored (i.e. sufficiently volatile).

____ 3.5 Indicate if groundwater or soil moisture will interfere with the vapor monitoring for more than 30-calendar days.

____ 3.6 Provide information establishing that the vapor monitoring wells or detection devices were installed to a depth two (2) feet deeper than the bottom(s) of the tank(s) and that the wells are clearly marked and secured with the well pad sloped and raised above surface grade. Submit a copy of the External UST System Release Detection Well Form(DEP8051/01/06) for each well installed at the site.

____ 3.7 Provide documentation establishing what type of monthly monitoring is being conducted for pressurized piping. Monitoring wells shall be installed at a distance of no more than 20 feet (6 meters) apart along any piping trench.

4.0 Interstitial Monitoring - External UST System Release Detection

____ 4.1 Submit documentation that the secondary barrier (liner) is of an artificial material, and is sufficiently thick and impermeable (at least 10^{-6} cm/sec) to direct a UST system release to a monitoring point (well).

____ 4.2 Provide information establishing that the backfill material within the excavation zone is sufficiently porous for the UST system liner to direct a UST system release to a monitoring point.

____ 4.3 For cathodically protected UST systems, submit information describing the compatibility of the liner with the system.

____ 4.4 Provide documentation relating the UST system liner with the regional 25-year flood plain and if the monitoring design of the liner and monitoring points are capable of operating under those flood conditions.

____ 4.5 Indicate if groundwater or soil moisture will interfere with the monthly monitoring.

____ 4.6 Submit information establishing that the monitoring wells or detection devices are clearly marked and secured with the well pad sloped and raised above surface grade.
Submit a copy of the External UST System Release Detection Well Form (January 2006) (DEP8051/01/06) for each well installed at the site.

APPENDIX A

CERTIFICATION OF THE SITE ASSESSMENT REPORT

Under the requirements of KRS Chapter 322 and 322A, this Site Assessment Report for external UST system release detection shall be completed and signed by a Professional Engineer (P.E.) registered with the Kentucky Board of Registration for Professional Engineers and Land Surveyors, or a Professional Geologist (P.G.) Registered with the Kentucky Board of Registration for Professional Geologists.

Signature_____ Date_____

Name and Title (Type or Print)_____

Registration Number, Date and Seal_____

I, the undersigned, state, under penalty of law, that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals responsible for obtaining the information, I certify that the submitted information is true, accurate and complete.

Company Name_____

Name and Title of Individual Whose Signature Appears Below_____

Signature*_____

Date of Signature_____

Subscribed and sworn to before me by_____

This the_____ Day of_____ ,20_____

Notary Public_____

My Commission Expires_____

Location of Commission_____

***NOTE** If individual signing this is someone other than the president or secretary of a corporation, attach a notarized copy of power of attorney, or resolution of board of directors, which grants individual the legal authority to represent the company. (does not apply to a single proprietorship or partnership.)